

CLASSIFICATION ~~CONFIDENTIAL~~ **CONFIDENTIAL**CENTRAL INTELLIGENCE AGENCY
INFORMATION FROM
FOREIGN DOCUMENTS OR RADIO BROADCASTS

REPORT

CD NO.

50X1-HUM

COUNTRY USSR
SUBJECT Scientific - Physics, explosivesDATE OF
INFORMATION 1950HOW
PUBLISHED Monthly periodical

DATE DIST. // Apr 1951

WHERE
PUBLISHED Moscow

NO. OF PAGES 2

DATE
PUBLISHED Dec 1950SUPPLEMENT TO
REPORT NO.

LANGUAGE Russian

THIS DOCUMENT CONTAINS INFORMATION AFFECTING THE NATIONAL DEFENSE
OF THE UNITED STATES WITHIN THE MEANING OF ESPIONAGE ACT NO.
U. S. C. 51 AND 52, AS AMENDED. ITS TRANSMISSION OR THE REVELATION
OF ITS CONTENTS IN ANY MANNER TO AN UNAUTHORIZED PERSON IS PRO-
HIBITED BY LAW. REPRODUCTION OF THIS FORM IS PROHIBITED.

THIS IS UNEVALUATED INFORMATION

SOURCE Zhurnal Tekhnicheskoy Fiziki, Vol XX, No 12, 1951, pp 1422-5.

PHOTOGRAPHICALLY RECORDING THE EXPLOSIVE WAVE
FORMING OUTSIDE A LINEAR EXPLOSIVE CHARGE

S. B. Ratner
Inst of Chem Phys
Acad of Sci USSR, Moscow
Submitted 22 Oct 1949

Experimental data was obtained on the speed and direction of the front of an explosive wave forming in air during detonation of a cylindrical explosive charge from 5 to 20 mm in diameter. An ordinary photo-recorder that gives photographs in path-time coordinates is used. The principle involved is that the detonation products and explosive wave are illuminated at the beginning of expansion. In their way is placed a screen, a glass plate, against which the explosive wave collides, causing an illumination. The nature of this illumination can be related to the increase in temperature of the explosive wave during its reflection, to the occurrence of chemical processes in the mixture of explosion products with the air, to the illumination of dust particles, explosive particles, etc. The collision of undecomposed particles of the explosive flying from the lateral surface of the charge against the screen is especially significant.

In these experiments the screen's plane intersects the optical axis of the recorder, the screen being placed between the charge and photographic film, as in the appended figure (if charge and screen are interchanged, the secondary illumination is obviously absent since the explosion products are not transparent). The screens are narrow glass plates 3 to 4 cm wide and 0.2 to 0.6 cm thick, and are placed in an inclined position so that varying distances are obtained between its surface and charge. Thus, by knowing the time from moment of detonation to moment of initial illumination of a point on the screen separated at a certain definite distance from the "point" charge, it was possible to calculate the speed of propagation of the wave front.

- 1 -

CONFIDENTIALCLASSIFICATION ~~CONFIDENTIAL~~ **CONFIDENTIAL**

| | | | | | | | | | | | | |
|-------|--|--|--------------|--|--|--|--|--|--|--|--|--|
| STATE | <input checked="" type="checkbox"/> NAVY | <input checked="" type="checkbox"/> NSRB | DISTRIBUTION | | | | | | | | | |
| ARMY | <input checked="" type="checkbox"/> AIR | <input checked="" type="checkbox"/> FBI | | | | | | | | | | |

CONFIDENTIAL

CONFIDENTIAL

50X1-HUM

To determine the direction of this wave front above the screen (see 1 in appended figure), another screen, 2, covers it; if the front is inclined downwards from the normal to the surface, its angle of inclination, A , will correspond to the illumination of a definite part of the screen, 2, located below point A.

Conclusions

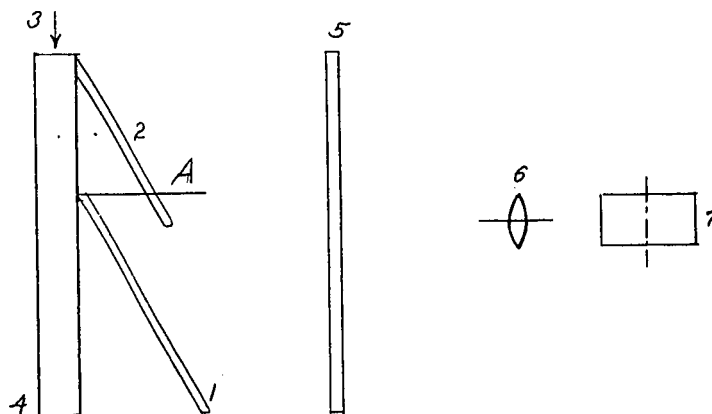
1. It is possible to record on moving photographic film the illumination occurring during the impact, on the screens, of the explosive moving from the lateral surface of the charge.

2. Fluid and solid explosives in glass or paper shells maintain almost always a constant velocity in air, about 2 to 4 km/sec, for distances reaching many times the radius of the explosive charge.

3. The angle between the front's direction and the normal to the surface of the charge is between 10 and 30° .

4. Increasing the diameter of the charge leads to increases in the speed of the recorded motion.

The author was assisted in this work by A. F. Belyev and G. I. Pokrovskiy.



1, 2, 5 are screens; 3 is the origin of detonation; 4 is the explosive charge; 6 is the objective lens; 7 is the rotating drum with the film.

- E N D -

- 2 -

CONFIDENTIAL

CONFIDENTIAL